

Subject: Proton Irradiation of Materials in Target Room 2

Present: D. Beavis, E.T. Lessard, C. Carlson, P. Thieberger, J. Reich, N. Simos, M. Fedurin, C. Schaefer, C. Cullen, and B. van Kuik

The committee met to review the request to irradiate materials in the tandem target room 2 with 28 MeV protons. The beam current would be 1 micro-amp and the exposure would occur for approximately 12 hours. N. Simos provided a completed¹ Target Record Form, 9.1.15.a. The experiment hopes to complete the irradiation by April 18, 2014.

The targets will be exposed in an existing chamber that is approximately 30 inches in size and has three inch thick steel walls. The copper base of the target array is cooled with liquid nitrogen (LN). The LN will be provided by a 180 liter Dewar. The intent is to vent the exhaust nitrogen into the room.

A calculation must be conducted to examine the potential for activation products in the nitrogen exhaust. If there is a contamination issue then an appropriate solution must be reviewed.

(CK-Tandem- April 14, 2014 -N. Simos& D. Beavis-870)

An ODH calculation must be conducted for a failure of the 180 liter Dewar. There is a calculator for ODH available through the SBMS.

(CK-Tandem- April 14, 2014 –R. Karol& D. Beavis-871)

Failure of the cooling could result in damage to the target. Target materials would be confined to the vacuum chamber but clean up would be an issue. A thermal couple will be attached to the copper or other appropriate location with readout to the operators. There will be a latching alarm if the temperature threshold is exceeded. Only the Supervisor will be allowed to reset the alarm. A procedure will be written to monitor and respond to the alarm.

(CK-Tandem- April 14, 2014 –N. Simos& C. Carlson-872)

¹ [TANDEM Experiment Target Record](#), N. Simos, March 24, 2014

After the exposure the room should stay secured for two hours to allow cool down. The first entry will be made by RCTs to conduct surveys and any swipes that may be needed for contamination checks. There is at least one chipmunk in the area that can provide dose rate information before entry.

(CK-Tandem- April 14, 2014 –P. Bergh & C. Carlson-873)

The target room doors should be posted as a radiation area based on expected dose rates after the exposure. The RCTs will update the posting as appropriate based on surveys.

(CK-Tandem- April 14, 2014 –P. Bergh & C. Carlson-874)

All transport of the irradiated materials will be conducted under the rules for radioactive materials. There is a transport pig for moving the entire assembly from the target room to Building 801. All work and transport will be conducted under an RWP. This will include the removal of the assembly from the vacuum chamber and placement into the pig. All handling and processing of the material in Building 801 must follow the established procedures for 801. The Facility Representative for 801 should be kept in the loop regarding the transfer of the materials.

(CK-Tandem- April 14, 2014 –P. Bergh & C. Carlson-875)

The history of operating the target rooms with high-energy and high-intensity beams was discussed. The target rooms were designed for 30 MeV deuterons and the areas were operated with high intensity and energy. Three stage operation enabled operation at energies higher than the initial design. The institution memory was that there was no radiation issues outside in the hallways and adjacent areas. The target rooms have not operated with energy for some time.

The previous surveys and fault studies should be reviewed to examine if there are any areas of concern. It was believed that F. Zafonte should be contacted and may be able to provide information on when the specific fault studies were conduct. It may be necessary to conduct new fault studies to ensure that target room 2 can handle the energy and intensity.

(CK-Tandem- April 14, 2014 –P. Bergh & C. Carlson-876)

The dual interlocks have been functionally checked and are ready for use for the proton beam.

High intensity tuning of the beam line can occur with only items 874 and 876 above completed. Low intensity tuning can occur with only item 874 completed if the tuning is accompanied with RCT surveys.

CC:

Present
RSC
RSC Minutes File
J. Alessi
F. Zafonte
N. Contos